

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 4575F/ACH/JAK	FOR FURTHER ACTION		see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.
International application No. PCT/GB 99/ 03984	International filing date (day/month/year) 30/11/1999	(Earliest) Priority Date (day/month/year) 01/12/1998	
Applicant PILKINGTON PLC, et al.			

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

a. With regard to the language, the International search was carried out on the basis of the International application in the language in which it was filed, unless otherwise indicated under this item.

☐ the International search was carried out on the basis of a translation of the International application furnished to this Authority (Rule 23.1(b)).

b. With regard to any nucleotide and/or amino acid sequence disclosed in the International application, the International search was carried out on the basis of the sequence listing:

☐ contained in the International application in written form.

☐ filed together with the International application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the International application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

2. ☐ Certain claims were found unsearchable (See Box I).

3. ☐ Unity of invention is lacking (see Box II).

4. With regard to the title,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the abstract,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this International search report, submit comments to this Authority.

6. The figure of the drawings to be published with the abstract is Figure No.

☒ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

1
☐ None of the figures.

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INTERNATIONAL SEARCH REPORT

International Application No

GB 99/03984

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C03C17/36

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C03C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP 0 275 662 A (PILKINGTON PLC) 27 July 1988 (1988-07-27) cited in the application claims	1-37
Y	EP 0 543 077 A (LEYBOLD AG) 26 May 1993 (1993-05-26) claims 1-11	1-37
X	DATABASE WPI Section Ch, Week 198823 Derwent Publications Ltd., London, GB; Class L01, AN 1988-158891 XP002131524 & JP 63 100043 A (NIPPON SHEET GLASS CO LTD), 2 May 1988 (1988-05-02) abstract	1-4

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

6 March 2000

Date of mailing of the international search report

13/03/2000

Name and mailing address of the ISA

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Authorized officer

Reedijk, A

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 99/03984

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 583 871 A (PILKINGTON UK LTD) 23 February 1994 (1994-02-23) page 5, line 26 - line 58 -----	1-37
A	CHEMICAL ABSTRACTS, vol. 115, no. 26, 30 December 1991 (1991-12-30) Columbus, Ohio, US; abstract no. 285686f, page 364; XP000373670 abstract & JP 03 126644 A (ASAHI OPTICAL CO. LTD.) 29 May 1991 (1991-05-29) -----	1-3

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

GB 99/03984

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 0275662	A	27-07-1988	AT 58114 T	15-11-1990
			AU 593966 B	22-02-1990
			AU 8288587 A	30-06-1988
			CA 1327143 A	22-02-1994
			CN 1018636 B	14-10-1992
			CS 8709789 A	12-09-1990
			DD 264911 A	15-02-1989
			DK 685687 A	25-06-1988
			FI 875657 A,B,	25-06-1988
			GB 2199848 A,B	20-07-1988
			GR 3002521 T	25-01-1993
			IE 60946 B	07-09-1994
			IN 170516 A	04-04-1992
			JP 1201046 A	14-08-1989
			JP 1942619 C	23-06-1995
			JP 6074158 B	21-09-1994
			KR 9502332 B	16-03-1995
			MX 170772 B	14-09-1993
			NO 875344 A,B,	27-06-1988
			PT 86460 A,B	01-01-1988
			SU 1830053 A	23-07-1993
			TR 23524 A	01-03-1990
			US 4828880 A	09-05-1989
			ZA 8709553 A	16-06-1988
EP 0543077	A	26-05-1993	DE 4135701 A	13-05-1993
			DE 59204255 D	14-12-1995
			ES 2079718 T	16-01-1996
			JP 5221692 A	31-08-1993
			US 5279722 A	18-01-1994
JP 63100043	A	02-05-1988	NONE	
EP 0583871	A	23-02-1994	AT 145195 T	15-11-1996
			AU 4152993 A	13-01-1994
			BR 9302815 A	22-02-1994
			CA 2099519 A	12-01-1994
			CN 1081657 A	09-02-1994
			CZ 9301318 A	16-02-1994
			DE 69305936 D	19-12-1996
			DE 69305936 T	17-04-1997
			DK 583871 T	21-04-1997
			EG 20125 A	31-07-1997
			ES 2096864 T	16-03-1997
			FI 933164 A	12-01-1994
			GB 2268509 A,B	12-01-1994
			GR 3022231 T	30-04-1997
			HU 70362 A	30-10-1995
			IL 106202 A	31-01-1996
			JP 6183787 A	05-07-1994
			MX 9304101 A	31-01-1994
			NZ 248032 A	24-02-1995
			PL 299635 A	21-03-1994
			TR 26801 A	08-08-1994
			US 5505989 A	09-04-1996
			US 5580364 A	03-12-1996
			US 5745291 A	28-04-1998
			ZA 9304664 A	25-01-1994

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

GB 99/03984

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
JP 3126644 A	29-05-1991	JP 1890317 C	07-12-1994
		JP 6013418 B	23-02-1994

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XP-002131524

AN - 1988-158891 [23]
AP - JP19860244777 19861015
CPY - NIPG
DC - L01
DR - 1544-U 1694-U 1966-U
FS - CPI
IC - C03C17/36
MC - L01-H05 L01-L02
PA - (NIPG) NIPPON SHEET GLASS CO LTD
PN - JP63100043 A 19880502 DW198823 005pp
PR - JP19860244777 19861015
XA - C1988-071083
XIC - C03C-017/36
AB - J63100043 Glass comprises a glass support, and a thin metal layer, e.g., of Au, Ag, etc. or a thin laminated layer of metal layer and high refractive index layer, e.g., TiO₂, Ta₂O₅ etc., formed on it. A primer comprising oxide(s) or nitride(s) of Si and/or Al is formed between the thin layer and the glass support.
- ADVANTAGE - Little effect on the glass characteristics, e.g., visible transparency, thermal reflectivity etc. even after electric heating.(0/2)
IW - THERMAL REFLECT GLASS AUTOMOBILE WINDSCREEN THIN METAL LAYER GOLD THIN LAMINATE METAL HIGH REFRACT INDEX COMPOUND TITANIUM DI OXIDE NITRIDE PRIME LAYER
IKW - THERMAL REFLECT GLASS AUTOMOBILE WINDSCREEN THIN METAL LAYER GOLD THIN LAMINATE METAL HIGH REFRACT INDEX COMPOUND TITANIUM DI OXIDE NITRIDE PRIME LAYER
NC - 001
OPD - 1986-10-15
ORD - 1988-05-02
PAW - (NIPG) NIPPON SHEET GLASS CO LTD
TI - Thermally reflecting glass for e.g. automobile windscreen - has thin metal layer e.g. gold or thin laminate of metal and high refractive index cpd. e.g. titanium di:oxide, and nitride primer layer

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XP 000373670

C03C17/36

M03C17:312

M03C17:352

P. 364

115:285686f **Manufacture of mirrors.** Ito, Hiroshi; Sasaki, Shiro (Asahi Optical Co., Ltd.) **Jpn. Kokai Tokkyo Koho JP 03,126,644 [91,126,644] (Cl. C03C17/36), 29 May 1991, Appl. 89/267,218, 12 Oct 1989; 6 pp.** The mirrors are manufd. by coating glass substrates with SiO₂ as base layer and Al as surface layer. The SiO₂ layer has a thickness 25-30 nm at ~20°, and is formed at decreasing coating rate for a total coating time of 40-60 s, and the Al layer is coated at 20-50° in 3-6 min to give total reflection. Mirrors prepd. by this method are uniformly coated and have no light-scattering pots.


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PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 4575F/JAK		FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/GB99/03984	International filing date (day/month/year) 30/11/1999	Priority date (day/month/year) 01/12/1998	
International Patent Classification (IPC) or national classification and IPC C03C17/36			
Applicant PILKINGTON PLC et al.			
<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 5 sheets, including this cover sheet.</p> <p><input type="checkbox"/> This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of sheets.</p>			
<p>3. This report contains indications relating to the following items:</p> <ul style="list-style-type: none"> I <input checked="" type="checkbox"/> Basis of the report II <input type="checkbox"/> Priority III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability IV <input type="checkbox"/> Lack of unity of invention V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement VI <input type="checkbox"/> Certain documents cited VII <input type="checkbox"/> Certain defects in the international application VIII <input checked="" type="checkbox"/> Certain observations on the international application 			
Date of submission of the demand 13/05/2000		Date of completion of this report 10.01.2001	
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465		Authorized officer Maurer, R Telephone No. +49 89 2399 8578	



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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB99/03984

I. Basis of the report

1. This report has been drawn on the basis of *(substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments (Rules 70.16 and 70.17).):*

Description, pages:

1-9 as originally filed

Claims, No.:

1-37 as originally filed

Drawings, sheets:

1/1 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:

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**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/GB99/03984

☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-37 yes
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-37 yes
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-37 yes
	No:	Claims	

2. Citations and explanations
see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:
see separate sheet

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**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/GB99/03984

1) Reference is made to the following documents:

D1 EP-A-0275662

D2 EP-A-0543077

D3 DATABASE WPI section Ch, week 198823, Derwent Publications Ltd. London
GB, AN 1988-158891

D4 EP-A-0583871

D5 CHEMICAL ABSTRACTS, vol. 115, no. 26, 30 December 1991, abstr. no. 285686f.

SECTION V

2) The applicant's arguments are convincing:

The present application fulfills the requirements of Articles 33(2) and (3) PCT:

None of the cited prior art documents discloses nor gives any hint to a process for the production of a heat-treatable, low emissivity coated glass as claimed in claim 1 of the present application (pyrolytic & vacuum deposition), nor to the multilayer coated substrate produced by this process, as claimed in claims 21 and 34 of the present application.

The cited prior art documents differ essentially from the claimed subject-matter of the present application in that none of them discloses all features of claims 1, 21 or 34 of the present application and as they relate to totally different subject-matters the person skilled in the art would also, even if combining them, not arrive at the subject-matter of the present application;

the cited prior art documents differ from the claimed subject-matter in that

D1 no disclosure of a 2nd layer, nor any hint as regards a vacuum deposition;

D2 relates in contrast to present applic. only to sputtering layers, no disclosure of a pyrolytic nor a vacuum deposition;

D3 although disclosing the same layer composition as in the present application, does not disclose the combination of pyrolytic and vacuum deposition of layers, D3 is silent about the deposition method/s used; accordingly the person skilled in the art does not get any hint as to use these deposition methods of the present applic. from D3;

D4 relates (in contrast to present applic.) to mirrors, D4 does not disclose the pyrolytic deposition of the underlayer nor the vacuum deposition of the reflective layer;

D5 relates (in contrast to present applic.) to mirrors, D5 does not disclose a pyrolytic deposition of the under layer.

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**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/GB99/03984

SECTION VIII

3a) It is noted that claims 34-36 of the present application do not contain all essential features of the present application (compare description page 1, last paragraph to page 2, 1st. paragraph) and thus these claims do not fulfil the requirements of Article 6 PCT.

3b) It is noted that due to the undefined wording of claim 37 ((i) process not defined and ii) reference to examples 1-4) renders the meaning of claim 37 vague and thus claim 37 does not fulfil the requirements of Article 6 PCT.

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 99/03984

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 C03C17/36

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C03C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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Y	EP 0 543 077 A (LEYBOLD AG) 26 May 1993 (1993-05-26) claims 1-11	1-37
X	DATABASE WPI Section Ch, Week 198823 Derwent Publications Ltd., London, GB; Class L01, AN 1988-158891 XP002131524 & JP 63 100043 A (NIPPON SHEET GLASS CO LTD), 2 May 1988 (1988-05-02) abstract	1-4



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

* Special categories of cited documents:

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
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- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- "&" document member of the same patent family

Date of the actual completion of the international search

6 March 2000

Date of mailing of the international search report

13/03/2000

Name and mailing address of the ISA

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Fax (+31-70) 340-3016

Authorized officer

Reedijk, A

INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 99/03984

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	CHEMICAL ABSTRACTS, vol. 115, no. 26, 30 December 1991 (1991-12-30) Columbus, Ohio, US; abstract no. 285686f, page 364; XP000373670 abstract & JP 03 126644 A (ASAHI OPTICAL CO. LTD.) 29 May 1991 (1991-05-29)	1-3

INTERNATIONAL SEARCH REPORT

information on patent family members

International Application No

PCT/GB 99/03984

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 0275662	A	27-07-1988	AT 58114 T	15-11-1990
			AU 593966 B	22-02-1990
			AU 8288587 A	30-06-1988
			CA 1327143 A	22-02-1994
			CN 1018636 B	14-10-1992
			CS 8709789 A	12-09-1990
			DD 264911 A	15-02-1989
			DK 685687 A	25-06-1988
			FI 875657 A, B,	25-06-1988
			GB 2199848 A, B	20-07-1988
			GR 3002521 T	25-01-1993
			IE 60946 B	07-09-1994
			IN 170516 A	04-04-1992
			JP 1201046 A	14-08-1989
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			JP 6074158 B	21-09-1994
			KR 9502332 B	16-03-1995
			MX 170772 B	14-09-1993
			NO 875344 A, B,	27-06-1988
			PT 86460 A, B	01-01-1988
			SU 1830053 A	23-07-1993
			TR 23524 A	01-03-1990
			US 4828880 A	09-05-1989
			ZA 8709553 A	16-06-1988
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			DE 59204255 D	14-12-1995
			ES 2079718 T	16-01-1996
			JP 5221692 A	31-08-1993
			US 5279722 A	18-01-1994
JP 63100043	A	02-05-1988	NONE	
EP 0583871	A	23-02-1994	AT 145195 T	15-11-1996
			AU 4152993 A	13-01-1994
			BR 9302815 A	22-02-1994
			CA 2099519 A	12-01-1994
			CN 1081657 A	09-02-1994
			CZ 9301318 A	16-02-1994
			DE 69305936 D	19-12-1996
			DE 69305936 T	17-04-1997
			DK 583871 T	21-04-1997
			EG 20125 A	31-07-1997
			ES 2096864 T	16-03-1997
			FI 933164 A	12-01-1994
			GB 2268509 A, B	12-01-1994
			GR 3022231 T	30-04-1997
			HU 70362 A	30-10-1995
			IL 106202 A	31-01-1996
			JP 6183787 A	05-07-1994
			MX 9304101 A	31-01-1994
			NZ 248032 A	24-02-1995
			PL 299635 A	21-03-1994
			TR 26801 A	08-08-1994
			US 5505989 A	09-04-1996
			US 5580364 A	03-12-1996
			US 5745291 A	28-04-1998
			ZA 9304664 A	25-01-1994

INTERNATIONAL SEARCH REPORT

information on patent family members

and Application No

PCT/GB 99/03984

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
JP 3126644 A	29-05-1991	JP 1890317 C	07-12-1994
		JP 6013418 B	23-02-1994

PCTWORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁷ : C03C 17/36	A1	(11) International Publication Number: WO 00/32530
		(43) International Publication Date: 8 June 2000 (08.06.00)

(21) International Application Number: PCT/GB99/03984

(22) International Filing Date: 30 November 1999 (30.11.99)

(30) Priority Data:
9826293.4 1 December 1998 (01.12.98) GB(71) Applicant (for all designated States except US): PILKINGTON
PLC [GB/GB]; Prescott Road, St. Helens, Merseyside WA10
3TT (GB).

(72) Inventor; and

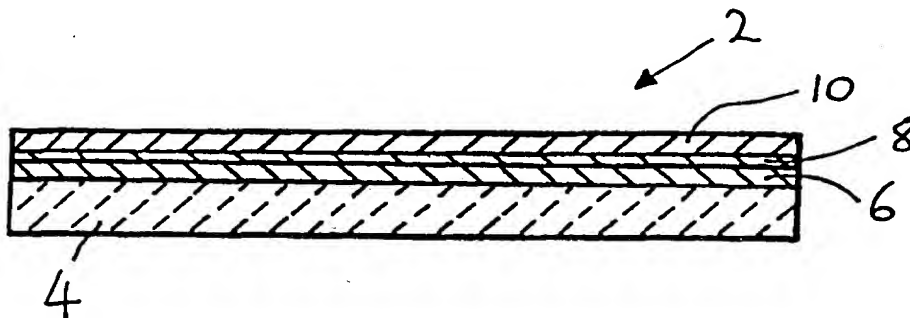
(75) Inventor/Applicant (for US only): GALLEGO, Jose, Manuel
[GB/GB]; 22 Ellerbrook Drive, Lathom, Ormskirk, Lancashire L40 5SZ (GB).

(74) Agents: HALLIWELL, Anthony, Charles et al.; Group Intellectual Property Dept., Pilkington plc, Pilkington European Technical Centre, Hall Lane, Lathom, Ormskirk, Lancashire L40 5UF (GB).

(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published*With international search report.*

(54) Title: IMPROVEMENTS IN COATING GLASS



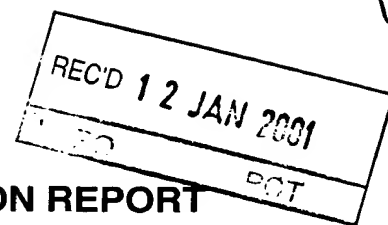
(57) Abstract

A process for the production of a heat-treatable low emissivity coated glass that comprises the steps of depositing an underlayer onto a glass substrate and subsequently depositing a reflective metal layer by a vacuum deposition process, wherein the underlayer is deposited by a pyrolytic deposition process. Preferably an anti-reflection layer is deposited by a vacuum deposition process on to the coated glass after deposition of the reflective metal layer. The underlayer may comprise a silicon oxide, the reflective metal layer may comprise silver and the anti-reflection layer may comprise a metal oxide, especially tin oxide or zinc oxide. The coated glass preferably has an emissivity of below 0.2 after heat treatment in an oxidising atmosphere.

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 4575F/JAK	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/GB99/03984	International filing date (day/month/year) 30/11/1999	Priority date (day/month/year) 01/12/1998
International Patent Classification (IPC) or national classification and IPC C03C17/36		
Applicant PILKINGTON PLC et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.



2. This REPORT consists of a total of 5 sheets, including this cover sheet.

- ☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☒ Certain observations on the international application

Date of submission of the demand 13/05/2000	Date of completion of this report 10.01.2001
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Maurer, R Telephone No. +49 89 2399 8578 



**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/GB99/03984

I. Basis of the report

1. This report has been drawn on the basis of *(substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments (Rules 70.16 and 70.17).):*

Description, pages:

1-9 as originally filed

Claims, No.:

1-37 as originally filed

Drawings, sheets:

1/1 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
☐ the language of publication of the international application (under Rule 48.3(b)).
☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority in written form.
☐ furnished subsequently to this Authority in computer readable form.
☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
☐ the claims, Nos.:

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB99/03984

☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-37 yes
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-37 yes
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-37 yes
	No:	Claims	

2. Citations and explanations
see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:
see separate sheet

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**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/GB99/03984

- 1) Reference is made to the following documents:
 - D1 EP-A-0275662
 - D2 EP-A-0543077
 - D3 DATABASE WPI section Ch, week 198823, Derwent Publications Ltd. London
GB, AN 1988-158891
 - D4 EP-A-0583871
 - D5 CHEMICAL ABSTRACTS, vol. 115, no. 26, 30 December 1991, abstr. no. 285686f.

SECTION V

- 2) The applicant's arguments are convincing:

The present application fulfills the requirements of Articles 33(2) and (3) PCT :
None of the cited prior art documents discloses nor gives any hint to a process for the production of a heat-treatable, low emissivity coated glass as claimed in claim 1 of the present application (pyrolytic & vacuum deposition), nor to the multilayer coated substrate produced by this process, as claimed in claims 21 and 34 of the present application.

The cited prior art documents differ essentially from the claimed subject-matter of the present application in that none of them discloses all features of claims 1, 21 or 34 of the present application and as they relate to totally different subject-matters the person skilled in the art would also, even if combining them, not arrive at the subject-matter of the present application ;

the cited prior art documents differ from the claimed subject-matter in that

D1 no disclosure of a 2nd layer, nor any hint as regards a vacuum deposition;

D2 relates in contrast to present applic. only to sputtering layers, no disclosure of a pyrolytic nor a vacuum deposition;

D3 although disclosing the same layer composition as in the present application, does not disclose the combination of pyrolytic and vacuum deposition of layers, D3 is silent about the deposition method/s used; accordingly the person skilled in the art does not get any hint as to use these deposition methods of the present applic. from D3;

D4 relates (in contrast to present applic.) to mirrors, D4 does not disclose the pyrolytic deposition of the underlayer nor the vacuum deposition of the reflective layer;

D5 relates (in contrast to present applic.) to mirrors, D5 does not disclose a pyrolytic deposition of the under layer.

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**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/GB99/03984

SECTION VIII

3a) It is noted that claims 34-36 of the present application do not contain all essential features of the present application (compare description page 1, last paragraph to page 2, 1st. paragraph) and thus these claims do not fulfil the requirements of Article 6 PCT.

3b) It is noted that due to the undefined wording of claim 37 ((i) process not defined and ii) reference to examples 1-4) renders the meaning of claim 37 vague and thus claim 37 does not fulfil the requirements of Article 6 PCT.

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TENT COOPERATION TRE. Y

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Assistant Commissioner for Patents
 United States Patent and Trademark
 Office
 Box PCT
 Washington, D.C.20231
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in its capacity as elected Office

Date of mailing (day/month/year) 27 July 2000 (27.07.00)	
International application No. PCT/GB99/03984	Applicant's or agent's file reference 4575F/ACH/JAK
International filing date (day/month/year) 30 November 1999 (30.11.99)	Priority date (day/month/year) 01 December 1998 (01.12.98)
Applicant GALLEGO, Jose, Manuel	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:
 13 May 2000 (13.05.00)

☐ in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was
☐ was not



made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer Pascal Piriou
Facsimile No.: (41-22) 740.14.35	Telephone No.: (41-22) 338.83.38

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EXHIBIT**B****1-15397 IDS****PATENT COOPERATION TREATY****PCT****INTERNATIONAL PRELIMINARY EXAMINATION REPORT**

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 4575F/JAK	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/GB99/03984	International filing date (day/month/year) 30/11/1999	Priority date (day/month/year) 01/12/1998
International Patent Classification (IPC) or national classification and IPC C03C17/36		
Applicant PILKINGTON PLC et al.		
<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 5 sheets, including this cover sheet.</p> <p><input type="checkbox"/> This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of sheets.</p>		
<p>3. This report contains indications relating to the following items:</p> <p>I <input checked="" type="checkbox"/> Basis of the report</p> <p>II <input type="checkbox"/> Priority</p> <p>III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p>IV <input type="checkbox"/> Lack of unity of invention</p> <p>V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p>VI <input type="checkbox"/> Certain documents cited</p> <p>VII <input type="checkbox"/> Certain defects in the international application</p> <p>VIII <input checked="" type="checkbox"/> Certain observations on the international application</p>		
Date of submission of the demand 13/05/2000	Date of completion of this report 10.01.2001	
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Maurer, R Telephone No. +49 89 2399 8578 	

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**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/GB99/03984

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☐ the claims, Nos.:

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**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/GB99/03984

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5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

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V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims 1-37 yes
	No: Claims
Inventive step (IS)	Yes: Claims 1-37 yes
	No: Claims
Industrial applicability (IA)	Yes: Claims 1-37 yes
	No: Claims

2. Citations and explanations

see separate sheet

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see separate sheet

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**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/GB99/03984

1) Reference is made to the following documents:

D1 EP-A-0275662

D2 EP-A-0543077

D3 DATABASE WPI section Ch, week 198823, Derwent Publications Ltd. London
GB, AN 1988-158891

D4 EP-A-0583871

D5 CHEMICAL ABSTRACTS, vol. 115, no. 26, 30 December 1991, abstr. no. 285686f.

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The cited prior art documents differ essentially from the claimed subject-matter of the present application in that none of them discloses all features of claims 1, 21 or 34 of the present application and as they relate to totally different subject-matters the person skilled in the art would also, even if combining them, not arrive at the subject-matter of the present application ;

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D5 relates (in contrast to present applic.) to mirrors, D5 does not disclose a pyrolytic deposition of the under layer.

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**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/GB99/03984

SECTION VIII

3a) It is noted that claims 34-36 of the present application do not contain all essential features of the present application (compare description page 1, last paragraph to page 2, 1st. paragraph) and thus these claims do not fulfil the requirements of Article 6 PCT.

3b) It is noted that due to the undefined wording of claim 37 ((i) process not defined and ii) reference to examples 1-4) renders the meaning of claim 37 vague and thus claim 37 does not fulfil the requirements of Article 6 PCT.

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INTERNATIONAL SEARCH REPORT

EXHIBIT

International Application No

PCT/GB 99/03984

1-15397 IDS

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 C03C17/36

SEP 17 2001

According to International Patent Classification (IPC) to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C03C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP 0 275 662 A (PILKINGTON PLC) 27 July 1988 (1988-07-27) cited in the application claims	1-37
Y	EP 0 543 077 A (LEYBOLD AG) 26 May 1993 (1993-05-26) claims 1-11	1-37
X	DATABASE WPI Section Ch, Week 198823 Derwent Publications Ltd., London, GB; Class L01, AN 1988-158891 XP002131524 & JP 63 100043 A (NIPPON SHEET GLASS CO LTD), 2 May 1988 (1988-05-02) abstract	1-4
	-/-	

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

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"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

6 March 2000

Date of mailing of the international search report

13/03/2000

Name and mailing address of the ISA

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Fax: (+31-70) 340-3016

Authorized officer

Reedijk, A

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INTERNATIONAL SEARCH REPORT

International Application No.

PCT/GB 99/03984

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 583 871 A (PILKINGTON UK LTD) 23 February 1994 (1994-02-23) page 5, line 26 - line 58	1-37
A	CHEMICAL ABSTRACTS, vol. 115, no. 26, 30 December 1991 (1991-12-30) Columbus, Ohio, US; abstract no. 285686f, page 364; XP000373670 abstract & JP 03 126644 A (ASAHI OPTICAL CO. LTD.) 29 May 1991 (1991-05-29)	1-3

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 99/03984

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0275662 A	27-07-1988	AT 58114 T	15-11-1990
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INTERNATIONAL SEARCH REPORT

information on patent family members

International Application No

PCT/GB 99/03984

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
JP 3126644 A	29-05-1991	JP 1890317 C	07-12-1994
		JP 6013418 B	23-02-1994

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